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An Evaluation of Selected Virtual Temperature Data Acquired at the APRF in 1994

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13. ABSTRACT *(Maximum 200 words)*

Composite vertical profiles of virtual temperature within the boundary laryer and troposphere over White Sands Missile Range , NM using Radio Acoustic Sounding Systems (RASS) data were first made available over the Internet in Feb 94. The composite virtual temperature profiles are based on selected levels of air temperature from a fixed tower and from the RASS associated with 924-, 404-, and 50-MHz radar profilers located at the Atmospheric Profiler Research Facility . Three questions arose with respect to these profiles: 1) how well do they compare with corresponding radiosonde temperature profiles, 2) were the RASS levels selected for each profiler optimal, and 3) how could automatic quality-control procedures be improved?

To address these questions, a set of composite virtual temperature profiles corresponding to a special series of radiosonde releases from a nearby site from Mar through Jul 94 were analyzed. As a result of these analyses, a revised set of RASS levels to be used with each profiler is proposed and an improved set of quality control criteria for application to the 404-MHz RASS data is suggested. Comparisons of the 924- and 404-MHz RASS virtual temperature with the corresponding radiosonde temperatures revealed that the agreement was less than or equal to 2.0 °C in 74 and 88 percent, respectively, of the comparisions. In those cases when either the profilers of the radiosondes showed temperature inversions, there was no corresponding inversion in the other profile. The inversion problem merits further investigation.

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1. Introduction

Since 31 Mar 94, composite vertical profiles of virtual temperature have been acquired at the Atmospheric Profiler Research Facility (APRF) utilizing 924-MHz profiler Radio Acoustic Sensing System (RASS) data from 341 to 1963 m AGL (17 levels), 404-MHz profiler RASS data from 2000 to 2750 m AGL (4 levels), and 50-MHz profiler RASS data above 2750 m AGL.

With respect to the contribution of the 924- and 404-MHz RASS data to the composite virtual temperature profiles, the three main questions to be addressed follow:

1. How well do the vertical profiles of virtual temperature obtained at the APRF with the 924- and 404-MHz RASS systems compare with simultaneous vertical profiles of air temperature obtained from radiosondes released from the nearby (6 km) Oasis Site?

2. Although the 924-MHz RASS data theoretically extend to 1963 m AGL, in reality the 924-MHz data rarely reach 1000 m AGL. How realistic is it to extend the lower limit of the 404-MHz RASS data to less than 2000 m AGL in the composite profile?

3. Without addressing the current problems with the 50-MHz RASS data, is it realistic to extend the upper limit of the 404-MHz RASS data to greater than 2750 m AGL in the composite profile to replace the 50-MHz RASS data?

It should be emphasized that the answers to these three questions are based on a limited amount of radiosonde comparison data.

2. Background

Technically, the 924- and 50-MHz RASS systems went on line on the Internet on 28 Jan 94. However, the data from the 50-MHz RASS system were questionable and have remained so to this date. The problem is that some 50-MHz RASS data appear fine, but other temporally and spatially close data are obviously erroneous, (vertically constant data of less than -100 °C). The first composite vertical profiles of virtual temperature became available over the Internet on 12 Feb.

The 404-MHz RASS system went on line on 24 Feb 94, but it was not until 8 Mar that the 404-MHz data were incorporated into the composite profile. From 8 to 10 Mar, the 404-MHz RASS data spanned the seven gates from 2000 to 3500 km AGL. On 11 Mar, the upper limit of the range was extended to about 7000 m AGL to replace the erroneous 50-MHz RASS data. On 19 Mar, the upper limit of the 404-MHz RASS data reverted back to 3500 m AGL because of concerns about the quality of the 404-MHz data above 3500 m. On 31 Mar, the 404-MHz RASS data were restricted to the four gates from 2000 to 2750 m AGL and have remained so to this date.

Because the National Oceanographic and Atmospheric Administration (NOAA) does not use a fixed upper limit for their RASS data, it was decided to undertake a comparison of radiosonde and 404-MHz RASS temperature data above 2750 m (a) to see the extent to which good data above 2750 m were being excluded from the composite profile, and (b) to establish guidelines for automatic quality control of the 404-MHz data, a major concern being the erroneous pseudo-isothermal layer seen in Flowers, et al. [1]

3. Discussion

3.1 Radiosonde/Profiler (924- and 404-MHz) Temperature Data Comparison

Question: How well do the vertical profiles of virtual temperature obtained at the APRF with the 924- and 404-MHz RASS systems compare with simultaneous vertical profiles of air temperature obtained from radiosondes (raobs) released from the nearby (6 km) Oasis Site?

Answer: 924-MHz - 74 percent ≤ 2.0 °C
404-MHz - 88 percent ≤ 2.0 °C

Comment: Where an inversion was present in the RASS data, there was never an inversion present in the radiosonde data and vice versa.

The basis of comparison of the vertical profiles of virtual temperature, as measured with both the 924 MHz- and 404-MHz RASS systems, were air temperature profiles, as measured with radiosondes released from Oasis Site. The radiosondes were scheduled for release at about 2000 UTC on Tuesdays and Thursdays. The time was selected to represent a well-mixed atmosphere and, thus, avoid complications of inversions.

The virtual temperature is the temperature that dry air would have if it had the same pressure and density as a given sample of moist air. Thus, the virtual temperature always exceeds the air temperature. The difference is very small in dry air, but can exceed 3 °C in very moist tropical air. Thus, for the dry conditions usually prevailing over south central NM, the difference between the virtual temperature and air temperature is usually very small. No attempt was made to convert the air temperature (as measured by the radiosonde) to virtual temperature through use of the relative humidity.

The 924- and 404-MHz data represent hourly averages with the time assigned to a given vertical profile referring to the end of the hour. Because the rise rate of the radiosonde balloon is about 300 m/min, the balloon ascends through the vertical range of the 924- and 404-MHz RASS data in the composite profile in less than 10 min. The radiosonde run selected for comparison was the one that occurred at the beginning of the RASS hour. Where simultaneous profiler and radiosonde data were not available, the rule of selection was relaxed and an allowance for up to 1 h was utilized. For example, on 5 Apr the radiosonde data acquired from a 1901 UTC release were compared to 404-MHz RASS data averaged over the period from 1800 to 1900 UTC because the RASS data for 2000 UTC were missing.

The radiosonde/profiler comparison series extended from 8 Mar 94, when the 404-MHz RASS data first appeared on Internet, to the 2000 UTC release on 28 Jul 94.

During this period of time, there were 32 radiosonde releases in which there were corresponding (within ± 1 h) 404-MHz RASS data and 34 radiosonde releases in which there were corresponding (within ± 1 h) 924-MHz RASS data from at least one level.

The level-by-level comparisons for the 924- and 404-MHz RASS data are shown in the appended tables. In the 404-MHz comparisons, the four RASS levels currently used in the composite profile are highlighted. The letter E (estimated), appended to the columnar radiosonde temperature and corresponding height data, signifies an interpolation.

No attempt was made to relate the differences to meteorological conditions, such as periods of convective activity when the spatial separation might play a significant role.

3.2 924-MHz Radiosonde Data Comparison

The appended tables show that the arithmetic mean difference between the 924-MHz virtual temperature and the corresponding radiosonde temperature for the full vertical extent of the 924-MHz data was less than or equal to 2 °C in

74 percent (25) of the 34 paired profiles. Four of the 34 paired profiles involved only a single level. The remaining nine comparisons showed arithmetic mean differences ranging from 2.2 °C to 5.3 °C:

31 Mar (3.2)	28 Apr (2.3)	23 Jun (3.8)
5 Apr (2.7)	24 May (3.5)	19 Jul (3.9)
12 Apr (2.2)	21 Jun (5.3)	28 Jul (4.0)

Five of the nine paired profiles exhibited inversions in the RASS data without a corresponding inversion in the radiosonde data (see below). Two of the five days (5 Apr and 19 Jul) also exhibited differences greater than 2.0 °C in the corresponding 404-MHz radiosonde comparisons. Note the marked similarity of the differences with height on 31 Mar and 24 May.

Of the 34 sets of 924-MHz radiosonde data comparisons, nine sets showed an inversion in virtual temperature, either near the ground or aloft:

8 Mar	31 Mar	19 Jul
17 Mar	28 Apr	26 Jul
22 Mar	24 May	28 Jul

However, in all nine cases there was no corresponding inversion in the radiosonde temperature data. In addition, there were no significant changes in moisture content in the radiosonde data that would suggest an inversion in virtual temperature. Moreover, there were no temperature inversions in the corresponding radiosonde temperature profiles for any of the 34 comparison sets. The RASS inversions could be caused by spatial moisture differences but this possibility was not pursued.

3.3 404-MHz Radiosonde Data Comparison

The appended tables show that the arithmetic mean difference between the 404-MHz virtual temperatures and the corresponding radiosonde temperature for the full vertical extent of the 404-MHz data was less or equal to 2 °C in 88 percent (28) of the cases. The remaining four comparisons showed mean differences ranging from 2.1 °C to 4.9 °C:

17 Mar (3.5)	5 Apr (4.9)
22 Mar (2.1)	19 Jul (2.7)

Table 1 shows that there were only seven temperature inversions for the 32 sets examined: two in the 404-MHz data and five in the radiosonde data. Moreover, in no case were there corresponding inversions in both the 404-MHz RASS and the radiosonde data.

Perhaps the most interesting inversion occurred on 12 Apr. The temperature inversion reported by the radiosonde between 1747 and 2003 m AGL also corresponded to an abrupt drop in relative humidity from 39 to 6 percent.

Table 1. Temperature inversions in profiler and radiosonde data

Date	404-MHz	Radiosonde	Comments
10 Mar	N	Y	
17 Mar	N	Y	Top of data set
5 Apr	Y	N	
12 Apr	N	Y	
26 Apr	N	Y	
28 Apr	Y	Y	Not at same height

3.4 924-MHz Profiler RASS Data

Question: Although the 924-MHz RASS data theoretically extend to 1963 m AGL, in reality the 924-MHz data rarely reach 1000 m AGL. How realistic is it to extend the lower limit of the 404-MHz RASS data to less than 2000 m AGL in the composite profile?

Answer: Depending on the availability of the 924- and 404-MHz RASS data, it appears that the lower end of the 404-MHz RASS data system could be extended from 2000 to 750 m AGL.

As previously noted, there were 34 radiosonde runs for which there were corresponding 924-MHz profiler RASS data during the period of 8 Mar through 28 Jul 94. Table 2 shows the distribution of the 34 RASS data sets as a function of the maximum altitude reached by the RASS system.

Thus, about 75 percent of the 924-MHz data sets achieve maximum altitudes of less than 750 m AGL. This leaves five 404-MHz RASS gates (750, 1000, 1250, 1500, and 1750 m AGL) that could be used in the event that valid data from these gates were available. A more detailed distribution using all of the valid 924-MHz data might be instructive. Another question not addressed here is the relative availability of the 924- and 404-MHz RASS data.

Table 2. Distribution of the 34 924-MHz RASS data sets as a function of maximum altitude attained with the data set

Max. Altitude of Good RASS Data (m AGL)	No. of RASS Data Sets Having the Max. Altitude
341	6
442	0
544	8
645	6
746	6
848	4
949	3
1051	1

3.5 404-MHz Profiler RASS Data

Question: Without addressing the current problems with the 50 MHz-RASS data, is it realistic to extend the upper limit of the 404-MHz RASS data to greater than 2750 m AGL in the composite profile?

Answer: Yes, as long as the nearly isothermal data about -8 °C or - 9 °C are removed from the 404-MHz RASS data sets.

Currently, only the temperatures corresponding to the gates at 2000, 2250, 2500, and 2750 m AGL are used in the composite vertical temperature profile. However, the 404-MHz RASS data are available at 250-m intervals from 500 m to as high as 5750 m AGL. Examination of the valid data within each of the 32 sets of 404-MHz RASS data associated with a corresponding radiosonde flight revealed that 75 percent (24) reached heights above 2750 m AGL.

In Flowers, et al., [1] each of the 404-MHz virtual temperature profiles compared with corresponding radiosonde data displayed an erroneous set of nearly isothermal values around -8 °C to -9 °C.

Critical to this vertical extension, is the flagging of erroneous 404-MHz RASS data. As was evident in the accuracy report, the continuity method has not been completely successful in flagging erroneous virtual temperature data. The main problem is the frequent occurrence of five or more consecutive levels of nearly isothermal data above 2000 m AGL and centered on or about -9.0 °C, which the continuity type of quality control will pass as legitimate data.

With that in mind, it became necessary to establish rules for the quality control of the 404-MHz RASS data.

Examination of the 404-MHz radiosonde pairs revealed four types of the erroneous isothermal sequences. Table 3 lists the types of erroneous isothermal

sequences in which missing data are identified by 9999.0, and the heights of which are not constant.

3.5.1 *Type 1*

The first type of erroneous isothermal sequence is identified by missing data (9999.0) separating apparently valid data at the lower levels from the erroneous isothermal data.

Rule: Delete all data at and above the first occurrence of missing data.

3.5.2 *Type 2*

In the second type of erroneous isothermal sequence, there is no 9999.0 separation, but there is an abrupt decrease in temperature from the lower level data to the isothermal values. The second type of erroneous isothermal sequence is more common in the warmer time of the year.

Rule: Where the lapse rate (change of temperature with altitude) exceeds -3 °C and the topping negative temperature is -8.x or -9.x, delete all data at and above the first occurrence of -8.x or -9.x.

3.5.3 *Type 3*

In the third type of erroneous isothermal sequence, there is no 9999.0 separation, but there is a meteorologically reasonable transition from the lower level data to the isothermal data. Frequently, only a single level is in question.

Rule: Where the lapse rate range is -3.0 °C to 0.0 °C and the topping negative temperature is -8.x or -9.x, delete all data at and above the first occurrence of -8.x or -9.x.

Table 3. Types of erroneous isothermal (shaded) sequences

Height (m AGL)	Type 1 3 May 0700 (°C)	Type 2 4 May 1600 (°C)	Type 3 12 Mar 0900 (°C)	Type 4 12 May 2400 (°C)
500	21.4	19.8	13.8	11.5
750	19.5	18.7	12.7	10.1
1000	17.3	16.9	10.2	8.5
1250	14.7	15.2	7.6	6.2
1500	11.7	13.3	5.2	3.8
1750	9.6	10.6	3.4	1.7
2000	7.0	7.9	1.6	-0.4
2250	4.4	5.7	-0.6	-2.9
2500	2.5	3.7	-3.2	-5.3
2750	0.6	2.4	-4.3	-7.7
3000	9999.0	1.4	-6.9	-9.6
3250	9999.0	0.3	-8.8	-10.7
3500	-9.2	-1.1	-9.4	-11.7
3750	-8.9	-2.4	-8.9	-9.0
4000	-9.0	-8.9	-8.9	-9.0
4250	-8.9	-8.9	-9.0	-8.9
4500	-8.9	-8.9	-8.9	-8.9
4750	-9.0	-8.9	-8.9	-8.9
5000	9999.0	-9.0	-9.0	-9.0
5250	9999.0	9999.0	-9.0	-8.9
5500	9999.0	9999.0	-9.7	-9.1
5750	9999.0	9999.0	9999.0	9999.0

3.5.4 *Type 4*

In the fourth type of erroneous isothermal sequence, there is no 9999.0 separation, but there is an inversion separating the lower level data from isothermal data. The fourth type of erroneous isothermal sequence is more common in the colder time of the year.

Rule: Where there is an inversion and where the top of the inversion involves negative temperatures of -8.x or -9.x, delete all data at and above the first occurrence of -8.x or -9.x.

3.5.5 *Lapse Rates*

In the future, it may be possible to utilize the lapse rate in establishing guidelines for editing the RASS data. However, one must be careful in applying the lapse rate.

Table 4 shows that, within the troposphere at White Sands Missile Range (WSMR), the mean annual lapse rate within the range of the 404-MHz is -1.7 °C per 250 m and the dry-adiabatic lapse rate is -2.5 °C per 250 m. The dry-adiabatic lapse rate of -2.5 °C per 250 m represents the maximum rate of decrease of temperature with altitude during stable atmospheric conditions. Thus, one of the initial criteria might be

$$\Delta T / \Delta z \ \textit{must be} \ \leq -2.5 \ ^{\circ}C/250 \ m. \tag{1}$$

However, lapse rates greater than the dry-adiabatic (super dry-adiabatic) occur at WSMR, but they are generally restricted to the convective (unstable) boundary layer. The convective boundary layer begins to develop shortly after sunrise, reaches its maximum vertical extent in the early afternoon, and collapses during the late afternoon. The depth of the convective boundary layer is also seasonally dependent; at WSMR the maximum height (third quartile) ranges from about 1350 m AGL in January to 4000 m AGL in June.

Table 4. Tropospheric lapse rate guide

Source	Lapse rate (°C/250 m)
WSMR Range Ref. Atmos.(mean annual)	−0.6 (0 - 750 m AGL) −1.7 (750 - 4850 m AGL)
U.S. Standard Atmos. (mean annual)	−1.6
Dry adiabiatic	−2.5

4. Conclusions

The RASS data from the 924- and 404-MHz profilers compared well with radiosonde data, with the exception of data sets in which inversions were present. In those cases where there was an inverison in the RASS temperature profile, there was no inversion in the corresponding radiosonde temperature.

The paucity of 924-MHz RASS data above 750 m AGL could be made up with 404-MHz RASS data; and the 404-MHz RASS data range could be extended upward from the current limit of 2500 m to the end of good data, typically about 3250 m. Selection rules were developed for the quality control of 404-MHz RASS data.

The complete lack of correlation between profiler and radiosonde data with respect to inversions will need to be resolved and should be the subject of a separate study.

Reference

1. Flowers, W. L., L. Parker, E. Santantonio, G. Hoidale, J. Hines, F. Eaton, W. Hatch, and S. McLaughlin, *Relative Accuracies of Wind, Virtual Temperature, and C_n^2 Profiler Measurements at the Atmospheric Profiler Research Facility (APRF)*, White Sands Missile Range, NM, (in preparation).

Acronyms and Abbreviations

APRF	Atmospheric Profiler Research Facility
NOAA	National Oceanographic and Atmospheric Administration
RASS	Radio Acoustic Sensing System
WSMR	White Sands Missile Range

Appendix

Tables of 924-MHz versus Radiosonde and 404-MHz versus Radiosonde Temperature Differences

A-1. 8 Mar 94 (Julian day 067) 924 MHz: 2000 UTC radiosonde: 1957 UTC

Height	924-MHz	Radiosonde	Height	ΔT
239	+11.3	+12.5E[a]	239E	−1.2
341	+11.6	+10.7E	341E	+0.9
442	+9.5	+9.0E	442E	+0.5
544	+7.9	+7.9	541	0.0
645	+7.1	+6.9E	645E	+0.2
746	+6.0	+6.0E	746E	0.0
848	+5.0	+4.9E	848E	+0.1
AVERAGE				+0.1

[a]E signifies an interpolation

A-2. 10 Mar 94 (Julian day 069) 924 MHz: missing

A-3. 15 Mar 94 (Julian day 074) 924 MHz: 2100 UTC radiosonde: 1955 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+17.9	+16.7E[a]	341E	+1.2
442	+17.2	+15.7E	442E	+1.5
544	+15.4	+14.6E	544E	+0.8
645	+14.6	+13.4	649	+1.2
746	+13.7	+12.6	746E	+1.1
848	+13.3	+11.9E	848E	+1.4
AVERAGE				+1.2

[a]E signifies an interpolation

A-4. 17 Mar 94 (Julian day 076) 924 MHz: 2200 UTC radiosonde: 2100 UTC

Height	924 MHz	Radiosonde	Height	ΔT
239	+22.9	+22.7E[a]	239E	+0.2
341	+23.0	+21.7E	341E	+1.3
442	+22.8	+20.4E	442E	+2.4
544	+18.4	+19.6	547	−1.2
645	+17.3	+18.7E	645E	−1.4
746	+17.7	+17.8E	746E	−0.1
848	+18.3	+16.7E	848E	+1.6
AVERAGE				+0.3

[a]E signifies an interpolation

A-5. 22 Mar 94 (Julian day 081) 924 MHz: 2100 UTC radiosonde: 2000 UTC

Height	924 MHz	Radiosonde	Height	ΔT
239	+19.3	+20.5E[a]	239E	−1.2
341	+19.2	+19.0E	341E	+0.2
442	+20.0	+17.3E	442E	+2.7
544	+16.0	+16.1	542	−0.1
AVERAGE				+0.4

[a]E signifies an interpolation

A-6. 24 Mar 94 (Julian day 083) 924 MHz: missing

A.7 29 Mar 94 (Julian day 088) 924 MHz: 2100 UTC radiosonde: 1957 UTC

Height	924 MHz	Radiosonde	Height	ΔT
239	+13.6	+14.0E[a]	239E	−0.4
341	+13.3	+13.0E	341E	+0.3
442	+12.4	+12.0E	442E	+0.4
544	+9.5	+11.1E	544E	−1.6
AVERAGE				−0.4

[a]E signifies an interpolation

A-8. 31 Mar 94 (Julian day 090) 924 MHz: 2100 UTC radiosonde: 1956 UTC

Height	924 MHz	Radiosonde	Height	ΔT
239	+17.5	+16.4E[a]	239E	+1.1
341	+17.0	+15.2E	341E	+1.8
442	+15.5	+13.9E	442E	+1.6
544	+15.1	+12.7E	544E	+1.4
645	+14.3	+11.9	639	+2.4
746	+16.4	+10.8E	746E	+5.6
848	+15.8	+9.9E	848E	+5.9
949	+14.9	+9.0	947	+5.9
AVERAGE				+3.2

[a]E signifies an interpolation

A-9. 5 Apr 94 (Julian day 095) 924 MHz: 2100 UTC radiosonde: 1901 UTC

Height	924 MHz	Radiosonde	Height	ΔT
239	+17.1	+14.7E[a]	239E	+2.4
341	+16.4	+13.5	337	+2.9
AVERAGE				+2.7

[a]E signifies an interpolation

A-10. 7 Apr 94 (Julian day 097) 924 MHz: missing

A-11. 12 Apr 94 (Julian day 102) 924 MHz: 2000 UTC radiosonde: 1859 UTC

Height	924 MHz	Radiosonde	Height	ΔT
239	+18.2	+16.3	240	+1.9
341	+17.9	+15.3E[a]	341E	+2.6
442	+17.3	+14.6E	442E	+2.7
544	+15.1	+13.4	545	+1.7
AVERAGE				+2.2

[a]E signifies an interpolation

A-12. 14 Apr 94 (Julian day 104) 924 MHz: missing

A-13. 19 Apr 94 (Julian day 109) 924 MHz: 1900 UTC radiosonde: 1903 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+24.6	+24.6E[a]	341E	0.0
442	+24.4	+23.5E	442E	+0.9
544	+21.8	+22.3	549	−0.5
AVERAGE				+0.1

[a]E signifies an interpolation

A-14. 21 Apr 94 (Julian day 111) 924 MHz: 2000 UTC radiosonde: 1859 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+24.0	+21.7E[a]	341E	+2.3
442	+21.8	+20.8E	442E	+1.0
544	+20.9	+19.8E	544E	+1.1
645	+20.0	+18.7E	645E	+1.3
746	+18.3	+17.8E	746E	+0.5
AVERAGE				+1.2

[a]E signifies an interpolation

A-15. 26 Apr 94 (Julian day 116) 924 MHz: missing

A-16. 28 Apr 94 (Julian day 118) 924 MHz: 2000 UTC radiosonde: 1854 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+14.9	+13.6	345	+1.3
442	+14.7	+12.5	437	+2.2
544	+14.7	+11.3E[a]	544E	+3.4
AVERAGE				+2.3

[a]E signifies an interpolation

A-17. 3 May 94 (Julian day 123) 924 MHz: missing

A-18. 5 May 94 (Julian day 125) 924 MHz: 2000 UTC radiosonde: 1854 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+24.1	+26.0E[a]	341E	−1.9
442	+24.0	+24.7E	442E	−0.7
544	+22.4	+23.3E	544E	−0.9
645	+21.6	+22.4E	645E	−0.8
AVERAGE				−1.1

[a]E signifies an interpolation

A-19. 10 May 94 (Julian day 130) 924 MHz: 2000 UTC radiosonde: 1856 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+20.4	+20.3E[a]	341E	+0.1
442	+19.2	+19.3	442	−0.1
544	+17.4	+18.6E	544E	−1.2
645	+16.7	+17.6E	645E	−0.9
746	+15.8	+16.5E	746E	−0.7
AVERAGE				−0.6

[a]E signifies an interpolation

A-20. 12 May 94 (Julian day 132) 924 MHz: 2000 UTC radiosonde: 1902 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+19.9	+18.0E[a]	341E	+1.9
442	+18.9	+17.1E	442E	+1.8
544	+16.7	+16.2E	544E	+0.5
645	+14.1	+15.1E	645E	−1.0
746	+13.5	+14.2E	746E	−0.7
848	+12.9	+13.2E	848E	−0.3
949	+11.6	+12.2E	949E	−0.6
AVERAGE				+0.2

[a]E signifies an interpolation

A-21. 17 May 94 (Julian day 137) 924 MHz: 2000 UTC radiosonde: 1900 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+27.1	+25.3E[a]	341E	+1.8
AVERAGE				+1.8

[a]E signifies an interpolation

A-22. 19 May 94 (Julian day 139) 924 MHz: missing

A-23. 24 May 94 (Julian day 144) 924 MHz: 2000 UTC radiosonde: 1854 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+25.2	+23.9E[a]	341E	+1.3
442	+25.1	+22.9	442E	+2.2
544	+23.4	+21.8E	544E	+1.6
645	+21.7	+20.9E	645E	+0.8
746	+23.6[b]	+19.8E	746E	+3.8
848	+25.9	+18.8E	848E	+7.1
949	+24.1	+17.7E	949E	+6.4
1051	+21.6	+16.8E	1051E	+4.8
AVERAGE				

[a]E signifies an interpolation
[b]no evidence of an inversion in the radiosonde data.

A-24. 26 May 94 (Julian day 146) 924 MHz: 2000 UTC radiosonde: 1858 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+20.0	+18.6E[a]	341E	+1.4
442	+19.0	+17.6E	442E	+1.4
544	+18.3	+16.4E	544E	+1.9
645	+18.0	+15.4E	645E	+2.6
746	+16.7	+14.6E	746E	+2.1
AVERAGE				+1.9

[a]E signifies an interpolation

A-25. 31 May 94 (Julian day 151) 924 MHz: 2000 UTC radiosonde: 1855 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+30.5	+32.6E[a]	341E	−2.1
442	+29.3	+31.0E	442E	−1.7
544	+28.0	+29.5E	544E	−1.5
AVERAGE				−1.7

[a]E signifies an interpolation

A-26. 2 Jun 94 (Julian day 153) 924 MHz: 2000 UTC radiosonde: 1854 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+26.0	+25.9E[a]	341E	+0.1
442	+25.1	+25.0E	442E	+0.1
544	+24.5	+24.0E	544E	+0.5
645	+23.8	+23.0	645E	+0.8
746	+22.9	+22.1E	746E	+0.8
848	+21.1	+21.1E	848E	+0.0
949	+20.4	+20.2E	949E	+0.2
AVERAGE				+0.4

[a]E signifies an interpolation

A-27. 7 Jun 94 (Julian day 158) 924 MHz: 2000 UTC radiosonde: 1901 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+28.6	+27.9E[a]	341E	+0.7
AVERAGE				

[a]E signifies an interpolation

A-28. 9 Jun 94 (Julian day 160) 924 MHz: 2000 UTC radiosonde: 1924 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+31.7	+30.5E[a]	341E	+1.2
AVERAGE				

[a]E signifies an interpolation

A-29. 14 Jun 94 (Julian day 165) 924 MHz: 2000 UTC radiosonde: 1901 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+34.0	+30.7E[a]	341E	+3.3
442	+31.8	+29.6E	442E	+2.2
544	+28.6	+28.5E	544E	+0.1
AVERAGE				+1.9

[a]E signifies an interpolation

A-30. 16 Jun 94 (Julian day 167) 924 MHz: 2000 UTC radiosonde: 1855 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+30.2	+29.5E[a]	341E	+0.7
442	+29.7	+28.5E	442E	+1.2
544	+29.1	+27.5E	544E	+1.6
645	+25.4	+26.5E	645E	−1.1
AVERAGE				+0.6

[a]E signifies an interpolation

A-31. 21 Jun 94 (Julian day 172) 924 MHz: 2000 UTC radiosonde: 1857 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+26.4	+21.7E[a]	341E	+4.7
442	+26.0	+20.8E	442E	+5.2
544	+25.3	+19.8E	544E	+5.5
645	+24.4	+18.8E	645E	+5.6
746	+23.3	+17.8E	746E	+5.5
848	+22.3	+16.9E	848E	+5.4
AVERAGE				+5.3

[a]E signifies an interpolation

A-32. 23 Jun 94 (Julian day 174) 924 MHz: 2000 UTC radiosonde: 1858 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+33.1	+29.9	342	+3.2
442	+32.3	+28.5E[a]	442E	+3.8
544	+31.6	+27.3	543	+4.3
645	+31.4	+26.3E	645E	+5.1
746	+27.9	+25.5E	746E	+2.4
AVERAGE				+3.8

[a]E signifies an interpolation

A-33. 28 Jun 94 (Julian day 179) 924 MHz: 2000 UTC radiosonde: 1858 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+35.3	+36.3E[a]	341E	−1.0
442	+33.7	+34.9E	442E	−1.2
544	+31.1	+33.4E	544E	−2.3
AVERAGE				−1.5

[a]E signifies an interpolation

A-34. 30 Jun 94 (Julian day 181) 924 MHz: 2000 UTC radiosonde: 1855 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+35.9	+34.6E	341E[a]	+1.3
AVERAGE				

[a]E signifies an interpolation

A-35. 5 Jul 94 (Julian day 186): missing

A-36. 7 Jul 94 (Julian day 188) 924 MHz: 2000 UTC radiosonde: 1856 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+32.6	+31.3E[a]	341E	+1.3
AVERAGE				

[a]E signifies an interpolation

A-37. 12 Jul 94 (Julian day 193) 924 MHz: 2000 UTC radiosonde: 1855 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+32.5	+29.6E[a]	341E	+2.9
442	+31.3	+28.7E	442E	+2.6
544	+27.2	+27.7E	544E	−0.5
645	+24.8	+26.7E	645E	−1.9
AVERAGE				+0.

[a]E signifies an interpolation

A-38. 14 Jul 94 (Julian day 195) 924 MHz: 2000 UTC radiosonde: 1800 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+25.4	+25.8E[a]	341E	−0.4
442	+24.9	+24.8E	442E	+0.1
544	+23.6	+23.7E	544E	−0.1
645	+22.4	+22.6E	645E	−0.2
746	+21.9	+21.3E	746E	+0.6
AVERAGE				0.0

[a]E signifies an interpolation

A-39. 19 Jul 94 (Julian day 200) 924 MHz: 2000 UTC radiosonde: 1851 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+29.6	+26.9E[a]	341E	+2.7
442	+29.9	+26.0E	442E	+3.9
544	+29.8	+25.0E	544E	+4.8
645	+28.4	+24.0E	645E	+4.4
AVERAGE				+3.9

[a]E signifies an interpolation

A-40. 21 Jul 94 (Julian day 202) 924 MHz: 2000 UTC radiosonde: 1853 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+28.1	+28.4E[a]	341E	−0.3
442	+26.5	+26.9E	442E	−0.4
544	+26.0	+25.5E	544E	+0.5
645	+25.1	+24.4	644	+0.7
746	+23.5	+23.5E	746E	0.0
AVERAGE				+0.1

[a]E signifies an interpolation

A-41. 26 Jul 94 (Julian day 207) 924 MHz: 2000 UTC radiosonde: 1856 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+28.4	+28.8	343	−0.4
442	+29.2	+27.8E[a]	442E	+1.4
544	+28.6	+26.8	546	+1.8
645	+28.6	+25.8E	645E	+2.8
AVERAGE				+1.4

[a]E signifies an interpolation

A-42. 28 Jul 94 (Julian day 209) 924 MHz: 2000 UTC radiosonde: 1900 UTC

Height	924 MHz	Radiosonde	Height	ΔT
341	+29.7	+23.1E[a]	341E	+6.6
442	+25.5	+22.2	441	+3.3
544	+23.4	+21.1E	544E	+2.3
645	+23.8	+20.0	642	+3.8
AVERAGE				+4.0

[a]E signifies an interpolation

A-43. 10 Mar 94 (Julian day 069) 404 MHz: 1300 UTC radiosonde: 1159 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+4.7	+4.6E[a]	500E	+0.1
750	+4.1	+3.2	754	+0.9
1000	+3.7	+3.0E	1000E	+0.7
1250	+2.7	+1.0	1248	+1.7
1500	+1.7	+0.4	1497	+1.3
1750	+0.1	−1.3E	1750E	+1.4
2000	−1.5	−3.0E	1997	+1.5
2250	−2.4	−3.0E	2250E	+0.6
2500	−3.8	−4.2E	2500E	+0.4
2750	−5.1	−6.2E	2750E	+1.1
3000	−6.6	−7.9E	3000E	+1.3
3250	−8.6	−9.6E	3250E	+1.2
3500	−10.4	−11.3E	3500E	+0.9
3750	−11.6	−12.4E	3750E	+0.8
4000	−13.1	−13.8	3996	+0.7
4250	−14.6	−16.0E	4250E	+1.4
4500	−16.9	−18.0E	4500E	+1.1
4750	−18.8	−19.9E	4750E	+1.1
5000	−20.9	−22.0E	5000E	+1.1
5250	−22.9	−23.6E	5250E	+0.7
5500	−24.8	−26.0E	5500E	+1.2
5750	−26.6	−27.7E	5750E	+1.1
AVERAGE				+1.0

[a]E signifies an interpolation

A-44. 15 Mar 94 (Julian day 074) 404 MHz: 2100 UTC radiosonde: 1955 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+15.7	+15.0E[a]	500E	+0.7
750	+13.9	+12.6	753	+1.3
1000	+12.7	+11.0E	1000E	+1.7
1250	+10.7	+9.2	1254	+1.5
1500	+9.0	+7.6E	1500E	+1.4
1750	+7.2	+5.6E	1750E	+1.6
2000	+5.2	+3.3	1997	+1.9
2250	+3.1	+1.1E	2250E	+2.0
2500	+1.1	−0.9E	2500E	+2.0
2750	−0.7	−2.6E	2750E	+1.9
3000	−2.3	−3.9E	3000E	+1.6
3250	−4.0	−5.0E	3250E	+1.0
3500	−4.6	−5.4E	3500E	+0.8
AVERAGE				+1.5

[a]E signifies an interpolation

A-45. 17 Mar 94 (Julian day 076) 404 MHz: 2200 UTC radiosonde: 2100 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+21.3	+20.1E[a]	500E	+1.2
750	+19.4	+17.7E	750E	+1.7
1000	+17.5	+15.2	1003	+2.3
1250	+15.5	+12.9E	1250E	+2.6
1500	+13.2	+10.5E	1500E	+2.7
1750	+10.8	+7.9E	1750E	+2.9
2000	+8.8	+5.5E	2000E	+3.3
2250	+8.1	+3.3	2247	+4.8
2500	+6.4	+1.0E	2500E	+5.4
2750	+5.3	−0.8E	2750E	+6.1
3000	+5.2	−0.4E	3000E	+5.6
AVERAGE				+3.5

[a]E signifies an interpolation

A-46. 22 Mar 94 (Julian day 081) 404 MHz: 2100 UTC radiosonde: 2000 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+17.1	+16.6	500E[a]	+0.5
750	+16.7	+14.2E	750E	+2.5
1000	+14.7	+11.7E	1000E	+3.0
1250	+12.8	+9.4	1250E	+3.4
1500	+10.4	+7.0E	1500E	+3.4
1750	+7.8	+4.9	1750E	+2.9
2000	+5.2	+3.0E	2000E	+2.2
2250	+3.1	+1.1E	2250E	+2.0
2500	+0.6	−0.1E	2500E	+0.7
2750	−1.7	−1.6E	2750E	−0.1
AVERAGE				+2.1

[a]E signifies an interpolation

A-47. 24 Mar 94 (Julian day 083) 404 MHz: 2100 UTC radiosonde: 1958 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+16.7	+15.3E[a]	500E	+1.4
750	+15.3	+12.9E	750E	+2.4
1000	+13.5	+10.7E	1000E	+2.8
1250	+10.1	+8.0E	1250E	+2.1
1500	+7.0	+5.3E	1500E	+1.7
1750	+4.5	+3.1E	1750E	+1.4
2000	+2.8	+1.0E	2000E	+1.8
2250	0.2	−1.2E	2250E	+1.4
2500	−2.3	−3.7E	2500E	+1.4
2750	−4.3	−5.8	2753	+1.5
3000	−5.2	−8.3E	3000E	+3.1
3250	−8.5	−10.4E	3250E	+1.9
3500	−11.1	−12.1E	3500E	+1.0
AVERAGE				+1.8

[a]E signifies an interpolation

A-48. 29 Mar 94 (Julian day 088) 404 MHz: 2100 UTC radiosonde: 1957 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+10.9	+11.5E[a]	500E	−0.6
750	+9.3	+9.1E	750E	+0.2
1000	+7.6	+7.0E	1000E	+0.6
1250	+5.8	+4.8E	1250E	+1.0
1500	+4.6	+2.9E	1500E	+1.7
1750	+2.9	+1.7E	1750E	+1.2
2000	+1.8	+0.5E	2000E	+1.3
2250	+0.2	−1.3E	2250E	+1.5
2500	−1.5	−3.2E	2500E	+1.7
AVERAGE				+1.0

[a]E signifies an interpolation

A-49. 31 Mar 94 (Julian day 090) 404 MHz: 2100 UTC radiosonde: 1956 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+15.5	+13.1E[a]	500E	+2.4
750	+14.4	+10.8E	750E	+3.6
1000	+12.1	+8.8E	1000E	+3.3
1250	+8.9	+7.4E	1250E	+1.5
1500	+7.2	+6.3E	1500E	+0.9
1750	+5.8	+4.4E	1750E	+1.4
2000	+4.0	+2.2E	2000E	+1.8
2250	+1.8	+0.3E	2250E	+1.5
2500	−0.7	−2.4E	2500E	+1.7
2750	−3.4	−4.9E	2750E	+1.5
3000	−5.0	−7.2E	3000E	+2.2
3250	−7.8	−9.0E	3250E	+1.2
3500	−8.7	−9.5	3504	+0.8
AVERAGE				+1.8

[a]E signifies an interpolation

A-50. 5 Apr 94 (Julian day 095) 404 MHz: 1900 UTC[a] radiosonde: 1901 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+11.3	+11.7E[b]	500E	−0.4
750	+10.7	+9.3E	750E	+1.4
1000	+10.3	+6.8E	1000E	+3.5
1250	+11.2	+4.4E	1250E	+6.8
1500	+10.5	+2.2E	1500E	+8.3
1750	+8.9	−0.7E	1750E	+9.6
AVERAGE				+4.9

[a]RASS data for 2000 UTC were missing
[b]E signifies an interpolation

A-51. 7 Apr 94 (Julian day 097) 404 MHz: 1900 UTC[a] radiosonde: 1859 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+15.7	+16.7	499	−1.0
750	+14.3	+14.2E[b]	750E	+0.1
1000	+11.8	+11.8E	1000E	0.0
1250	+8.6	+9.1E	1250E	−0.5
1500	+5.7	+6.7	1497	−1.0
1750	+2.9	+4.2E	1750E	−1.3
2000	+0.2	+2.0E	2000E	−1.8
2250	−1.7	−0.2E	2250E	−1.5
AVERAGE				−0.9

[a]RASS data for 2000 UTC were missing
[b]E signifies an interpolation

A-52. 12 Apr 94 (Julian day 102) 404 MHz: 2000 UTC radiosonde: 1859 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+15.7	+13.9E[a]	500E	+1.8
750	+14.5	+11.3E	750E	+3.2
1000	+11.4	+8.9E	1000E	+2.5
1250	+8.8	+6.2E	1250E	+2.6
1500	+7.4	+3.9E	1500E	+3.5
1750	+5.0	+1.6E	1747	+3.4
2000	+2.5	+2.2[b]	2003	+0.3
2250	+0.6	+0.3E	2250E	+0.3
2500	−1.2	−1.1	2498	−0.1
2750	−3.6	−0.9E	2750E	−2.7
3000	−3.8	−0.8	3000E	−3.0
3250	−4.2	−2.9	3250E	−1.3
3500	−5.1	−5.1	3500E	0.0
AVERAGE				+0.8

[a]E signifies an interpolation
[b]Inversion w/drop in RH from 39 to 6.

A-53. 14 Apr 94 (Julian day 104) 404 MHz: 2000 UTC radiosonde: 1855 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+19.0	+18.7E[a]	500E	+0.3
750	+17.0	+16.3	747	+0.7
1000	+14.5	+13.9E	1000E	+0.6
1250	+11.5	+11.5E	1250E	0.0
1500	+10.1	+9.1E	1500E	+1.0
1750	+7.4	+6.5E	1750E	+0.9
2000	+4.8	+4.3	1997	+0.5
2250	+2.3	+1.9E	2250E	+0.4
2500	+0.4	+0.1E	2500E	+0.3
AVERAGE				+0.5

[a]E signifies an interpolation

A-54. 19 Apr 94 (Julian day 109) 404 MHz: 1900 UTC[a] radiosonde: 1903 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+21.2	+22.9E[b]	500E	−1.7
750	+19.5	+20.4E	750E	−0.9
1000	+18.2	+18.0E	1000E	+0.2
1250	+16.8	+15.6E	1250E	+1.2
1500	+15.1	+13.2E	1500E	+1.9
1750	+12.8	+11.1E	1750E	+1.7
2000	+10.5	+8.8E	2000E	+1.7
2250	+8.1	+6.5E	2250E	+1.6
2500	+5.2	+4.3E	2500E	+0.9
2750	+4.7	+1.9E	2750E	+2.8
3000	+3.3	−0.3E	3000E	+3.6
AVERAGE				+0.8

[a]RASS data for 2000 UTC were missing
[b]E signifies an interpolation

A-55. 21 Apr 94: missing

A-56. 26 Apr 94 (Julian day 116) 404 MHz: 2000 UTC radiosonde: 1900 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+15.0	+15.3E[a]	500E	−0.3
750	+12.4	+11.5E	750E	+0.9
1000	+10.8	+8.9E	1000E	+1.9
1250	+7.7	+6.5E	1250E	+1.2
1500	+4.2	+4.1E	1500E	+0.1
1750	+1.0	+1.6E	1750E	−0.6
2000	−2.5	−0.7E	2000E	−1.8
2250	−4.0	−2.8	2250E	−1.2
2500	−4.7	−2.1E	2500E	−2.6
AVERAGE				−0.3

[a]E signifies an interpolation

A-57. 28 Apr 94 (Julian day 118) 404 MHz: 2000 UTC radiosonde: 1854 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+12.4	+11.8E[a]	500E	+0.6
750	+12.8	+9.0E	750E	+3.8
1000	+10.9	+6.5	997	+4.4
1250	+7.4	+4.3E	1250E	+3.1
1500	+3.7	+2.2E	1500E	+1.5
1750	+1.6	+0.6E	1750E	+1.0
2000	−0.5	−1.2E	2000E	+0.7
2250	−2.3	−2.8E	2250E	+0.5
2500	−3.5	−4.5E	2500E	+1.0
2750	−3.9	−4.9	2756	+1.0
3000	−4.0	−4.7	3000E	+0.7
3250	−4.1	−6.3	3250E	+2.2
AVERAGE				+1.7

[a]E signifies an interpolation

A-58. 3 May 94 (Julian day 123) 404 MHz: 2000 UTC radiosonde: 1858 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+22.6	+20.2E[a]	500E	+2.4
750	+18.4	+17.5E	750E	+0.9
1000	+15.6	+15.2	1000E	+0.4
1250	+12.8	+12.8E	1250E	0.0
1500	+10.3	+10.3E	1500E	0.0
1750	+8.1	+7.9E	1750E	+0.2
2000	+6.1	+5.4E	2000E	+0.7
2250	+4.3	+3.1E	2250E	+1.2
2500	+2.9	+1.0E	2500E	+1.9
2750	+2.1	−0.6E	2750E	+2.7
AVERAGE				+1.0

[a]E signifies an interpolation

A-59. 5 May 94 (Julian day 125) 404 MHz: 2000 UTC radiosonde: 1854 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+24.4	+23.9E	500E[a]	+0.5
750	+22.1	+21.5E	750E	+0.6
1000	+19.2	+19.2E	1000E	0.0
1250	+17.0	+16.8E	1250E	+0.2
1500	+14.6	+14.3E	1500E	+0.3
1750	+12.6	+12.7E	1750E	−0.1
2000	+10.8	+10.4E	2000E	+0.4
2250	+9.7	+8.3E	2250E	+1.4
2500	+7.8	+6.3E	2500E	+1.5
2750	+5.9	+4.2E	2750E	+1.7
3000	+3.6	+1.8	3000E	+1.8
3250	+1.6	−0.2	3250E	+1.8
3500	0.0	−2.0	3500E	+2.0
AVERAGE				+0.9

[a]E signifies an interpolation

A-60. 10 May 94 (Julian day 130) 404 MHz: 2000 UTC radiosonde: 1856 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+18.8	+18.9E[a]	500E	−0.1
750	+16.3	+16.5E	750E	−0.2
1000	+14.3	+14.1	1002	+0.2
1250	+11.7	+11.7E	1250E	0.0
1500	+9.6	+9.2E	1500E	+0.4
1750	+8.4	+7.1E	1750E	+1.3
2000	+4.7	+4.9E	2000E	−0.2
2250	+2.7	+3.0	2247	−0.3
2500	+1.3	+0.4E	2500E	+0.9
2750	−0.3	−1.2	2753	+0.9
3000	−1.4	−3.5	3000E	+2.1
3250	−3.0	−5.9	3250E	+2.9
AVERAGE				+0.7

[a]E signifies an interpolation

A-61. 12 May 94: missing

A-62. 17 May 94 (Julian day 137) 404 MHz: 2000 UTC radiosonde: 1900 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+23.3	+23.6E[a]	500E	−0.3
750	+22.3	+21.6E	750E	+0.7
1000	+19.6	+19.2E	1000E	+0.4
1250	+16.9	+16.7E	1250E	+0.2
1500	+15.0	+14.1E	1500E	+0.9
1750	+11.6	+11.6E	1750E	0.0
2000	+9.6	+9.2E	2000E	+0.4
2250	+8.3	+7.5E	2250E	+0.8
2500	+6.3	+6.1E	2500E	+0.2
AVERAGE				+0.4

[a]E signifies an interpolation

A-63. 19 May 94 (Julian day 139) 404 MHz: 2000 UTC radiosonde: 1853 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+22.6	+20.6E[a]	500E	+2.0
750	+20.1	+18.1E	750E	+2.0
1000	+17.9	+15.9E	1000E	+2.0
1250	+15.4	+13.1	1250	+2.3
1500	+12.9	+11.0E	1500E	+1.9
1750	+10.7	+8.8E	1750E	+1.9
2000	+9.0	+7.2	2000	+1.8
2250	+7.0	+5.1E	2250E	+1.9
2500	+5.2	+3.4E	2500E	+1.8
2750	+3.7	+2.5E	2750E	+1.2
3000	+2.6	+1.4	3000E	+1.2
3250	+0.8	−0.9	3250E	+1.7
AVERAGE				+1.8

[a]E signifies an interpolation

A-64. 24 May 94: missing

A-65. 26 May 94 (Julian day 146) 404 MHz: 2000 UTC radiosonde: 1858 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+17.6	+16.9E[a]	500E	+0.7
750	+16.9	+14.6E	750E	+2.3
1000	+14.3	+12.3E	1000E	+2.0
1250	+11.8	+10.0E	1250E	+1.8
1500	+9.6	+7.5E	1500E	+2.1
1750	+7.4	+5.1E	1750E	+2.3
2000	+5.2	+3.1E	2000E	+2.1
2250	+3.3	+1.3	2245	+2.0
2500	+1.4	−0.5E	2500E	+1.9
2750	−0.3	−2.2E	2750E	+1.9
3000	−1.9	−4.1E	3000E	+2.2
3250	−3.8	−6.0E	3250E	+2.2
3500	−4.9	−7.4	3497	+2.5
3750	−8.2	−9.2E	3500E	+1.0
AVERAGE				+1.9

[a]E signifies an interpolation

A-66. 31 May 94 (Julian day 151) 404 MHz: 2000 UTC radiosonde: 1855 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+30.2	+30.1E[a]	500E	+0.1
750	+27.9	+26.4E	750E	+1.5
1000	+24.5	+23.9E	1000E	+0.6
1250	+21.8	+21.5E	1250E	+0.3
1500	+19.2	+19.0E	1500E	+0.2
1750	+16.4	+16.6E	1750E	−0.2
2000	+14.4	+14.4E	2000E	0.0
2250	+12.6	+11.9	2253	+1.3
2500	+11.9	+9.4E	2500E	+2.5
2750	+8.9	+6.9E	2750E	+2.0
3000	+6.8	+4.6E	3000E	+1.2
3250	+6.6	+2.5	3246	+4.1
AVERAGE				+1.1

[a]E signifies an interpolation

A-67. 2 Jun 94 (Julian day 153) 404 MHz: 2000 UTC radiosonde: 1854 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+22.6	+24.5E[a]	500E	−1.9
750	+21.7	+22.1E	750E	−0.4
1000	+20.2	+19.9	999	+0.3
1250	+19.3	+17.8E	1250E	+1.5
1500	+17.9	+15.9E	1500E	+2.0
1750	+15.5	+13.8E	1750E	+1.7
2000	+13.2	+11.7	2004E	+1.5
2250	+11.1	+9.9E	2250E	+1.2
2500	+9.1	+7.8E	2500E	+1.3
2750	+7.1	+5.9E	2750E	+1.2
3000	+5.1	+3.8E	3000E	+1.3
3250	+3.0	+1.5E	3250E	+1.5
3500	+1.1	−0.3E	3500E	+1.4
3750	−0.7	−2.3E	3750E	+1.6
4000	−3.1	−4.7E	4000E	+1.6
4250	−5.8	−7.2E	4250E	+1.4
AVERAGE				+1.1

[a]E signifies an interpolation

A-68. 7 Jun 94 (Julian day 158) 404 MHz: 2000 UTC radiosonde: 1901 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+29.2	+26.4E[a]	500E	+2.8
750	+25.5	+24.1	746	+1.4
1000	+21.5	+22.0	1003	−0.5
1250	+19.8	+19.5E	1250E	+0.3
1500	+17.5	+17.0E	1500E	+0.5
1750	+15.4	+14.7E	1750E	+0.7
2000	+13.2	+12.4	1997	+0.8
2250	+11.1	+10.1	2247	+1.0
2500	+8.7	+7.9	2500	+0.8
2750	+6.6	+5.4E	2750E	+1.2
3000	+4.2	+4.3E	3002	−0.1
3250	+3.1	+2.5E	3250E	+0.6
AVERAGE				+0.8

[a]E signifies an interpolation

A-69. 9 Jun 94 (Julian day 160) 404 MHz: 2000 UTC radiosonde: 1924 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+28.2	+29.0	498	−0.8
750	+26.4	+26.5E[a]	750E	−0.1
1000	+24.5	+24.0E	1000E	+0.5
1250	+21.8	+21.6E	1250E	+0.2
1500	+19.8	+19.5E	1500E	+0.3
1750	+17.6	+17.0E	1750E	+0.6
2000	+15.3	+14.6E	2000E	+0.7
2250	+12.9	+12.3E	2250E	+0.6
2500	+10.5	+9.7E	2500E	+0.8
2750	+8.4	+7.5E	2750E	+0.9
3000	+6.7	+5.1E	3000E	+1.6
AVERAGE				+0.5

[a]E signifies an interpolation

A-70. 14 Jun 94 (Julian day 165) 404 MHz: 2000 UTC radiosonde: 1901 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+29.1	+29.0E[a]	500E	+0.1
750	+28.0	+26.7E	750E	+1.3
1000	+25.6	+24.1E	1000E	+1.5
1250	+23.0	+21.7	1254	+1.3
1500	+19.8	+19.3E	1500E	+0.5
1750	+17.6	+16.8E	1750E	+0.8
2000	+16.0	+14.5E	2000E	+1.5
2250	+13.8	+12.2E	2250E	+1.6
2500	+10.9	+9.7E	2500E	+1.2
2750	+9.0	+7.9E	1750E	+1.1
3000	+7.4	+5.6E	3000E	+1.8
3250	+5.1	+3.3E	3250E	+1.8
3500	+3.0	+1.0E	3500E	+2.0
AVERAGE				+1.3

[a]E signifies an interpolation

A-71. 16 Jun 94: missing

A-72. 21 Jun 94: missing

A-73. 23 Jun 94: missing

A-74. 28 Jun 94 (Julian day 179) 404 MHz: 2000 UTC radiosonde: 1858 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+32.2	+34.0E[a]	500E	−1.8
750	+30.0	+31.0	753	−1.0
1000	+28.1	+28.7E	1000E	−0.6
1250	+25.8	+26.4E	1250E	−0.6
1500	+23.9	+24.0E	1500E	−0.1
1750	+21.7	+21.5E	1750E	+0.2
2000	+19.3	+19.0	2003	+0.3
2250	+17.1	+18.6	2251	−1.5
2500	+14.8	+14.6E	2500E	+0.2
2750	+13.4	+12.1E	2750E	+1.3
3000	+11.5	+9.7E	3000E	+1.8
AVERAGE				−0.2

[a]E signifies an interpolation

A-75. 30 Jun 94: missing

A-76. 5 Jul 94: missing

A-77. 7 Jul 94: missing

A-78. 12 Jul 94 (Julian day 193) 404 MHz: 2000 UTC radiosonde: 1855 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+29.2	+28.1E[a]	500E	+1.1
750	+28.2	+25.5E	750E	+2.6
1000	+26.4	+23.5E	1000E	+2.9
1250	+24.2	+22.1E	1250E	+2.1
1500	+21.6	+20.2E	1500E	+1.4
1750	+18.9	+17.7E	1750E	+1.2
2000	+16.6	+15.7E	2000E	+0.9
2250	+14.6	+13.4	2248	+1.2
2500	+12.4	+10.9E	2500E	+1.5
2750	+10.2	+8.7E	2750E	+1.5
3000	+7.9	+6.5E	3000E	+1.4
3250	+5.3	+4.1	3248	+1.2
3500	+3.1	+1.7E	3500E	+1.4
3750	+1.3	+0.1E	3750E	+1.2
AVERAGE				+1.6

[a]E signifies an interpolation

A-79. 14 Jul 94 (Julian day 195) 404 MHz: 1900 UTC radiosonde: 1800 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+24.9	+24.2E[a]	500E	+0.7
750	+23.3	+21.3E	750E	+2.0
1000	+22.2	+19.2E	1000E	+3.0
1250	+20.0	+18.3	1250	+1.7
1500	+18.3	+17.2E	1500E	+1.1
1750	+17.0	+16.1E	1750E	+0.9
2000	+15.3	+14.1E	2000E	+1.2
2250	+13.8	+12.6E	2250E	+1.2
2500	+12.1	+10.9E	2500E	+1.2
2750	+10.1	+9.1	2747	+1.0
3000	+8.0	+6.9E	3000E	+1.1
3250	+5.8	+4.6E	3250E	+1.2
3500	+3.7	+2.3E	3500E	+1.4
3750	+1.6	+0.1E	3750E	+1.5
AVERAGE				+1.4

[a]E signifies an interpolation

A-80. 19 Jul 94 (Julian day 200) 404 MHz: 2000 UTC radiosonde: 1851 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+29.5	+25.4E[a]	500E	+4.1
750	+27.8	+23.0E	750E	+4.8
1000	+24.9	+20.6E	1000E	+4.3
1250	+21.5	+18.1E	1250E	+3.4
1500	+19.2	+15.7E	1500E	+3.5
1750	+16.6	+13.3E	1750E	+3.3
2000	+13.6	+11.0E	2000E	+2.6
2250	+11.4	+8.8	2248	+2.6
2500	+9.2	+6.9E	2500E	+2.3
2750	+6.9	+5.2	2750	+1.7
3000	+5.0	+3.6E	3000E	+1.4
3250	+2.6	+2.0	3247	+0.6
3500	+1.0	+0.2E	3500E	+0.8
3750	+0.4	−1.8E	3750E	+2.2
AVERAGE				+2.7

[a]E signifies an interpolation

A-81. 21 Jul 94 (Julian day 202) 404 MHz: 2000 UTC radiosonde: 1853 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+24.7	+26.2E[a]	500E	−1.5
750	+23.9	+23.5E	750E	+0.4
1000	+21.9	+21.0E	1000E	+0.9
1250	+19.5	+18.8E	1250E	+0.7
1500	+17.8	+16.7E[b]	1500E	+1.1
1750	+16.1	+15.4E	1750E	+0.7
2000	+14.7	+13.1E	2000E	+1.6
2250	+12.9	+10.8E	2250E	+2.1
2500	+10.8	+8.8E	2500E	+2.0
2750	+8.7	+6.8E	2750E	+1.9
3000	+6.9	+5.1E	3000E	+1.8
3250	+4.9	+3.2E	3250E	+1.7
3500	+2.9	+1.2E	3500E	+1.7
3750	+0.8	−0.9E	3750E	+1.7
4000	−1.2	−3.0	4004	+1.8
AVERAGE				+1.2

[a]E signifies an interpolation
[b]Radiosonde data show a weak inversion at 1515 m AGL

A-82. 26 Jul 94 (Julian day 207) 404 MHz: 2000 UTC radiosonde: 1856 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+29.5	+27.3E[a]	500E	+2.2
750	+27.6	+24.8	754	+2.8
1000	+23.9	+22.6E	1000E	+1.3
1250	+20.9	+20.1	1253	+0.8
1500	+18.8	+17.7E	1500E	+1.1
1750	+17.3	+15.4	1753	+1.9
2000	+15.4	+13.7	2000	+1.7
2250	+13.7	+11.8E	2250E	+1.9
2500	+11.8	+10.1E	2500E	+1.7
2750	+9.7	+7.8E	2750E	+1.9
3000	+7.8	+6.2E	3000E	+1.6
3250	+5.8	+4.3	3246	+1.5
3500	+3.8	+1.9E	3500E	+1.9
3750	+2.1	+0.6E	3750E	+1.5
4000	+0.2	−1.3E	4000E	+1.5
AVERAGE				+1.7

[a]E signifies an interpolation

A-83. 28 Jul 94 (Julian day 209) 404 MHz: 2000 UTC radiosonde: 1900 UTC

Height	404 MHz	Radiosonde	Height	ΔT
500	+21.6	+21.5E[a]	500E	+0.1
750	+20.9	+18.9	753	+2.0
1000	+19.3	+16.8E	1000E	+2.5
1250	+17.4	+14.6E	1250E	+2.8
1500	+15.4	+13.8E	1500E	+1.6
1750	+14.3	+12.5E	1750E	+1.8
2000	+13.1	+11.1E	2000E	+2.0
2250	+11.2	+9.3E	2250E	+1.9
2500	+9.7	+7.8	2500	+1.9
2750	+8.3	+6.6E	2750E	+1.7
3000	+6.5	+5.2E	3000E	+1.3
3250	+4.6	+3.4	3252	+1.2
3500	+2.9	+1.7E	3500E	+1.2
3750	+1.1	−0.1E	3750E	+1.2
4000	−0.8	−2.2E	4000E	+1.4
AVERAGE				+1.6

[a]E signifies an interpolation

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NY 13441-4514 1

AFMC DOW
WRIGHT PATTERSON AFB
OH 0334-5000 1

ARMY FIELD ARTLLRY SCHOOL
ATSF TSM TA
FT SILL OK 73503-5600 1

NAVAL AIR DEV CTR
CODE 5012
ATTN AL SALIK
WARMINISTER PA 18974 1

ARMY FOREGN SCI TECH CTR
CM
220 7TH STREET NE
CHARLOTTESVILLE
VA 22901-5396 1

NAVAL SURFACE WEAPONS CTR
CODE G63
DAHLGREN VA 22448-5000 1

ARMY OEC
CSTE EFS
PARK CENTER IV
4501 FORD AVE
ALEXANDRIA VA 22302-1458 1

ARMY CORPS OF ENGRS
ENGR TOPOGRAPHICS LAB
ETL GS LB
FT BELVOIR VA 22060 1

TAC DOWP
LANGLEY AFB
VA 23665-5524 1

ARMY TOPO ENGR CTR
CETEC ZC 1
FT BELVOIR VA 22060-5546 1

LOGISTICS CTR
ATCL CE
FT LEE VA 23801-6000 1

SCI AND TECHNOLOGY 101 RESEARCH DRIVE HAMPTON VA 23666-1340	1
ARMY NUCLEAR CML AGCY MONA ZB BLDG 2073 SPRINGFIELD VA 22150-3198	1
ARMY FIELD ARTLLRY SCHOOL ATSF F FD FT SILL OK 73503-5600	1
USATRADOC ATCD FA FT MONROE VA 23651-5170	1
ARMY TRADOC ANALYSIS CTR ATRC WSS R WSMR NM 88002-5502	1
ARMY RESEARCH LABORATORY AMSRL BE M BATTLEFIELD ENVIR DIR WSMR NM 88002-5501	1
ARMY RESEARCH LABORATORY AMSRL BE A BATTLEFIELD ENVIR DIR WSMR NM 88002-5501	1
ARMY RESEARCH LABORATORY AMSRL BE W BATTLEFIELD ENVIR DIR WSMR NM 88002-5501	1
ARMY RESEARCH LABORATORY AMSRL BE ATTN MR VEAZEY BATTLEFIELD ENVIR DIR WSMR NM 88002-5501	1
DEFNS TECH INFO CTR CENTER DTIC BLS BLDG 5 CAMERON STATION ALEXANDRIA VA 22304-6145	1

ARMY MISSILE CMND AMSMI REDSTONE ARSENAL AL 35898-5243	1
ARMY DUGWAY PROVING GRD STEDP 3 DUGWAY UT 84022-5000	1
USATRADOC ATCD FA FT MONROE VA 23651-5170	1
ARMY FIELD ARTLRY SCHOOL ATSF FT SILL OK 73503-5600	1
WSMR TECH LIBRARY BR STEWS IM IT WSMR NM 88001	1
Record Copy	10
Total	96